IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

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	§	
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	§	
Filed: October 28, 2003	§	Examiner: Scott C. Sun
	§	
For: APPARATUS AND METHOD FOR	§	
DATA MIGRATION IN A STORAGE	§	Docket No. 112-0122US
PROCESSING DEVICE	§	

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APPEAL BRIEF

1

TABLE OF CONTENTS

I.   **REAL PARTY IN INTEREST**

Brocade Communications Systems, Inc. is the real party in interest

II.   **RELATED APPEALS AND INTERFERENCES**

None

III. STATUS OF CLAIMS

Claims 1-36 are rejected. The appealed claims are 1-36.

IV.   STATUS OF AMENDMENTS

None filed

V.   SUMMARY OF CLAIMED SUBJECT MATTER

This section provides a concise explanation of the subject matter defined in each of the independent claims involved in the appeal, referring to the specification by paragraph and line number and to the drawings by reference characters as required by 37 CFR § 41.37(c)(l)(v). Each element of the claims is identified with a corresponding reference to the specification and drawings where applicable Note that the citation to passages in the specification and drawings for each claim element does not imply that the limitations from the specification and drawings should be read into the corresponding claim element.

Independent claim 1 provides for a storage processing device (SAP 100, Figs, 1A, 1B; ¶ 40) for use in a switched fabric (network 114, Fig. 1A; fabric 116, Fig. 1B; ¶ 41), the switched fabric including at least one switch (¶ 41) and the storage processing device, with the storage processing device coupled to the at least one switch (¶ 44), with first and second storage units (iSCSI target 112, FC target 106, Figs. 1A, 1B; ¶¶ 40-44) connected to and coupled through the switched fabric and coupled to the at least one switch and the storage processing device, where the first and second storage units may be directly connected to the storage processing device or may be coupled through the at least one switch (Figs. 1A, 1B; ¶ 44), the storage processing device to migrate data from the first storage unit to the second storage unit (Figs. 4, 6, 19, 20A, 20B; ¶¶215-220), whether the first and second storage units are directly connected to the storage processing device or are coupled through the at least one switch the storage processing device comprising:

an input/output module (200, Figs. 2, 4: ¶¶ 46, 52, 53) for coupling to the first and second storage units including processors (400, Figs. 4, 5; ¶¶ 52, 55-63) to receive, operate on and transmit network traffic; and

a control module (202, Figs. 2, 6; ¶¶ 46, 47, 64) coupled to said input/output module, said input/output module (420, Fig. 4) and said control module (420, Fig. 6) being configured to interactively perform data migration (¶ 215) from the first storage unit to the second storage unit.

Independent claim 10 provides for a switched fabric (network 114, Fig. 1A; fabric 116, Fig. 1B; ¶ 41) for connection to and coupling of at least one host (FC host 102, iSCSI host 108, Figs. 1A, 1B; ¶¶ 40-44) and at least two storage units (iSCSI target 112, FC target 106, Figs. 1A, 1B; ¶¶ 40-44), the fabric comprising:

at least one switch (¶ 41) for coupling to the at least one host and the at least two storage units; and

a storage processing device (SAP 100, Figs, 1A, 1B; ¶ 40) coupled to the at least one switch (¶ 44) and for coupling to the at least one host and first and second storage units of the at least two storage units, where the first and second storage units may be directly connected to the storage processing device or may be coupled through the at least one switch (Figs. 1A, 1B; ¶ 44), the storage processing device to migrate data between first and second storage units of the at least two storage units (Figs. 4, 6, 19, 20A, 20B; ¶¶215-220) whether the first and second storage units are directly connected to the storage processing device or are coupled through the at least one switch, the storage processing device including:

an input/output module (200, Figs. 2, 4: ¶¶ 46, 52, 53) including processors (400, Figs. 4, 5; ¶¶ 52, 55-63) to receive, operate on and transmit network traffic; and

a control module (202, Figs. 2, 6; ¶¶ 46, 47, 64) coupled to said input/output module, said input/output module (420, Fig. 4) and said control module (420, Fig. 6) being configured to interactively perform data migration between the first and second storage units.

Independent claim 19 provides for a network comprising:

at least one host (FC host 102, iSCSI host 108, Figs. 1A, 1B; ¶¶ 40-44) adapted to be connected to a switched fabric;

at least two storage units (iSCSI target 112, FC target 106, Figs. 1A, 1B; ¶¶ 40-44), each adapted to be connected to a switched fabric; and

a switched fabric (network 114, Fig. 1A; fabric 116, Fig. 1B; ¶ 41) connected to and coupling the at least one host and the at least two storage units, the switched fabric comprising:

at least one switch (¶ 41) for coupling to the at least one host and the at least two storage units; and

8

a storage processing device (SAP 100, Figs, 1A, 1B; ¶ 40) coupled to the at least

one switch (¶ 44) and for coupling to the at least one host and first and second storage units of

the at least two storage units, where the first and second storage units may be directly connected

to the storage processing device or may be coupled through the at least one switch (Figs. 1A, 1B;

¶ 44), the storage processing device to migrate data between the first and second storage units

(Figs. 4, 6, 19, 20A, 20B; ¶¶215-220) whether the first and second storage units are directly

connected to the storage processing device or are coupled through the at least one switch, the

storage processing device including:

an input/output module (200, Figs. 2, 4: ¶¶ 46, 52, 53) including

processors (400, Figs. 4, 5; ¶¶ 52, 55-63) to receive, operate on and transmit network traffic; and

a control module (202, Figs. 2, 6; ¶¶ 46, 47, 64) coupled to said

input/output module, said input/output module (420, Fig. 4) and said control module (420, Fig.

6) being configured to interactively perform data migration between the first and second storage

units.

Independent claim 28 provides for a method for supporting data migration between first

and second storage units (iSCSI target 112, FC target 106, Figs. 1A, 1B; ¶¶ 40-44) connected to

and coupled through a switched fabric (network 114, Fig. 1A; fabric 116, Fig. 1B; ¶ 41), the

switched fabric including at least one switch (¶ 41) and a storage processing device (SAP 100,

Figs, 1A, 1B; ¶ 40), the storage processing device coupled to the at least one switch (¶ 44),

where the first and second storage units may be directly connected to the storage processing

device or may be coupled through the at least one switch (Figs. 1A, 1B; ¶ 44), the method

comprising in the storage processing device:

providing an input/output module (200, Figs. 2, 4: ¶¶ 46, 52, 53) including processors

(400, Figs. 4, 5; ¶¶ 52, 55-63) receiving, operating on and transmitting network traffic; and

providing a control module (202, Figs. 2, 6; ¶¶ 46, 47, 64) coupled to said input/output

module, said input/output module (420, Fig. 4) and said control module (420, Fig. 6) being

configured to interactively perform data migration between the first and second storage units

whether the first and second storage units are directly connected to the storage processing device

or are coupled through the at least one switch.

9

VI.   GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

Claims 1-36 stand rejected under 35 U.S.C. § 112, ¶ 2 as being indefinite and under 35 U.S.C. § 102 over Testardi, U.S. Patent Appln. 2003/0140210.

VII. ARGUMENT

The claims do not stand or fall together. Instead, appellants present separate arguments for various independent and dependent claims After a concise discussion of cited art, each of these arguments is separately argued below and presented with separate headings and sub-heading as required by 37 CFR § 41.37(c)(l)(vii).

A. § 112 Rejection

The Office Action rejected claims 1-36 based on "may be" language present in independent claims 1, 10, 19 and 28. The Office Action states that the "may be" language merely suggests or makes optional but does not require steps to be performed or does not limit a claim to a particular structure. Applicants submit that the claims are allowable.

Exemplary language from claim 19 is:

> a storage processing device coupled to the at least one switch and for coupling to the at least one host and first and second storage units of the at least two storage units, where the first and second storage units may be directly connected to the storage processing device or may be coupled through the at least one switch, the storage processing device to migrate data between the first and second storage units whether the first and second storage units are directly connected to the storage processing device or are coupled through the at least one switch...

Contrary to the statement in the Office Action, Applicants submit that it is very clear that the "may be" language sets up two alternative structures, the first where the storage units are directly connected to the storage processing device and the second where the storage units are coupled to the storage processing device through at least one switch. The language then requires that the storage processing device migrate data between the storage units in either configuration. Thus the claim language clearly sets up two alternative structures and requires the storage processing device to work for both structures. Therefore the claim language actually defines two particular structures and requires operation with both structures, whichever one is actually implemented.

Applicants submit that the claims are, in fact, distinct and clearly define steps to be performed or particular structures. Reversal of the rejection is requested.

B. § 102 Rejections

Applicants respectfully submit that the present claims are allowable.

C. Claim 19

Claim 19 is being treated as an exemplary claim in these remarks to better track the Office Action. The Office Action rejected claim 19 over Testardi. Applicants respectfully traverse the rejection.

Applicants note that the claim specifically requires that the storage processing device may have the storage units directly connected or coupled through an external switch and the data migration is performed in either case as discussed above in relation to the § 112 rejection. Applicants submit that Testardi does not teach or suggest this requirement. Testardi is cited for the processing in the I/O module as well as the control module with the required interactivity. However Testardi does not teach or suggest that the storage devices can be connected through a switch and have the processing of Testardi still be operational. Testardi indicates that the storage units must be directly connected to the storage processing device. Figure 4A of Testardi shows direct connection but at a general level. Figure 4B of Testardi is more specific and shows the hosts and storage units directly connected. Figure 4C adds external switches to Figure 4B but only hosts are attached to the switches, not storage units. There is no teaching or suggestion in Testardi that the storage units can be connected to the storage processing device through a switch and have the data migration operations still be successfully performed. Asserting that the storage units could be connected through a switch goes against the express teachings of Testardi and so is an improper rejection.

Applicants thus submit that Testardi does not teach or suggest all of the required claim elements. Because this required element of claim 19, and similar claims 1, 10 and 28, is missing, Applicants submit that all of the present claims are allowable as all of the independent claims are allowable.

D. Claim 3

As an exemplary claim, Applicants will address the rejection of claim 3.[1] The Office Action rejects Claim 3 based on Testardi's barrier range and retries as described in paragraph 207. In prior Office Actions it was stated that Testardi discloses the fast path delaying data write operations if the barrier entry relates to data write operation by faulting the operations to the control path. This has previously been noted as being interpreted as the fast path delaying the write operations on the barrier range. As the Office Action repeats the prior rejections verbatim but provides no further comments, Applicants assume those prior explanations of the rejection are still relevant. Applicants respectfully traverse this interpretation. The claim requires the processors, which are located in the input/output module, to delay the write operations. The cited operation of Testardi has the fast path, equated to the processors of the claim, not handling the operation at all but transferring the operation to the control path, which then faults the operation to force a retry. But the claim requires the processors, i.e. the fast path, delaying the operation. In Testardi the fast path does nothing, not delay, not handle, nothing. It simply passes the operation on to the control path. This does not meet the positive requirement in the claim that the processors perform the delaying operation. Applicants understand and acknowledge the prior statements that the limitations of the specification are not to be read into the claims but submit that the requirement that the processors delay the write operation is a positive element in the claims and that the fast path of Testardi passing off the operation does not meet the positive requirement of the processors delaying the operation. There is no teaching or suggestion to have the fast path perform a delay rather than pass off the operation.

The prior comments attempted to address this argument but apparently misinterpreted it. It was argued that the Testardi fast path is an implementation of hardware and/or software. Applicants do not dispute this, and, as noted above, have treated the Testardi fast path as being equated to the processors. Applicants instead focus on a required action of the processors, namely delaying write operations if a barrier entry relates to the write operation. Applicants prior statement "the fast path does nothing, not delay, not handle, nothing" was in the context of

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[1] Applicants will treat the rejections of the dependent claims as being § 102 rejections based on Testardi alone even though the Office Action references the combination of Edsall and Testardi in rejecting each of the dependent claims. This is done based on the opening sentences of the rejections and that all of the specific recitation in the dependent claim rejections only reference portions of Testardi. The inclusion of the Edsall and Testardi language is thus assumed to be a cut and past error from a prior rejection and not intended in this Office Action.

write operations and barrier entries, not in the abstract as apparently previously interpreted. As Applicants have stated, the claim specifically requires the processors to delay write operations if a barrier entry relates to the write operation. The processors, i.e., fast path for this argument, of Testardi pass off the operation to the control path, which then faults to force a retry. Therefore it is clear that the fast path does not delay write operations if a barrier entry relates to the write operations. The fast path simply does not handle write operations if a barrier entry relates to the write operations. Rephrased again, the fast path takes no active part, i.e., does nothing, for write operations if a barrier entry relates to the write operations. Testardi teaches that such operations must be handled outside of the fast path or processors. This is directly opposed to the claim requirement that the processors delay such write operations.

Applicants submit that claim 3 and similar claims 12, 17, 21, 26, 30 and 35 are allowable.

E. Conclusion

For the reasons stated above, Applicants respectfully submit that the rejections should be reversed. Applicants believe that they have complied with each requirement for an appeal brief. If any member of the Board of Appeals has any questions or otherwise feels it would be advantageous, he or she is encouraged to telephone the undersigned at (832) 446-2405.

In the course of the foregoing discussions, Applicants may have at times referred to claim limitations in shorthand fashion, or may have focused on a particular claim element. This discussion should not be interpreted to mean that the other limitations can be ignored or dismissed. The claims must be viewed as a whole, and each limitation of the claims must be considered when determining the patentability of the claims. Moreover, it should be understood that there may be other distinctions between the claims and the prior art which have yet to be raised, but which may be raised in the future.

Respectfully submitted,

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Filed Electronically

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15

VIII. CLAIMS APPENDIX

1. (Previously Presented)   A storage processing device for use in a switched fabric, the switched fabric including at least one switch and the storage processing device, with the storage processing device coupled to the at least one switch, with first and second storage units connected to and coupled through the switched fabric and coupled to the at least one switch and the storage processing device, where the first and second storage units may be directly connected to the storage processing device or may be coupled through the at least one switch, the storage processing device to migrate data from the first storage unit to the second storage unit, whether the first and second storage units are directly connected to the storage processing device or are coupled through the at least one switch the storage processing device comprising:

an input/output module for coupling to the first and second storage units including processors to receive, operate on and transmit network traffic; and

a control module coupled to said input/output module, said input/output module and said control module being configured to interactively perform data migration from the first storage unit to the second storage unit.

2. (Previously Presented)   The storage processing device of claim 1, wherein said processors include table information related to data migration and wherein said control module is coupled to said table information to maintain said table information for data migration.

3. (Previously Presented)   The storage processing device of claim 2, wherein said table information includes a barrier entry and said processors delay data write operations if said barrier entry relates to said data write operation.

4. (Previously Presented)   The storage processing device of claim 2, wherein said table information includes an entry related to the extents in the data migration, said entry defining an extent operation type.

16

5. (Previously Presented)   The storage processing device of claim 4, wherein said table information further includes a legend entry for each extent operation type defining migration operations for the extent.

6. (Original)   The storage processing device of claim 5, wherein said table information further includes entries referenced by said legend entry defining physical extent location.

7. (Original)   The storage processing device of claim 6, wherein legend entries include entries indicating data not migrated, data migrated and a barrier entry for data being migrated.

8. (Previously Presented)   The storage processing device of claim 7, wherein said processors delay data write operations if said barrier entry relates to said data write operation.

9. (Original)   The storage processing device of claim 8, wherein said control module provides commands to copy data and places said barrier entry for said data being copied.

10. (Previously Presented)   A switched fabric for connection to and coupling of at least one host and at least two storage units, the fabric comprising:

at least one switch for coupling to the at least one host and the at least two storage units; and

a storage processing device coupled to the at least one switch and for coupling to the at least one host and first and second storage units of the at least two storage units, where the first and second storage units may be directly connected to the storage processing device or may be coupled through the at least one switch, the storage processing device to migrate data between first and second storage units of the at least two storage units whether the first and second storage units are directly connected to the storage processing device or are coupled through the at least one switch, the storage processing device including:

an input/output module including processors to receive, operate on and transmit network traffic; and

17

a control module coupled to said input/output module, said input/output module and said control module being configured to interactively perform data migration between the first and second storage units.

11. (Previously Presented) The fabric of claim 10, wherein said processors include table information related to data migration and wherein said control module is coupled to said table information to maintain said table information for data migration.

12. (Previously Presented) The fabric of claim 11, wherein said table information includes a barrier entry and said processors delay data write operations if said barrier entry relates to said data write operation.

13. (Previously Presented) The fabric of claim 11, wherein said table information includes an entry related to the extents in the data migration, said entry defining an extent operation type.

14. (Previously Presented) The fabric of claim 13, wherein said table information further includes a legend entry for each extent operation type defining migration operations for the extent.

15. (Original) The fabric of claim 14, wherein said table information further includes entries referenced by said legend entry defining physical extent location.

16. (Original) The fabric of claim 15, wherein legend entries include entries indicating data not migrated, data migrated and a barrier entry for data being migrated.

17. (Previously Presented) The fabric of claim 16, wherein said processors delay data write operations if said barrier entry relates to said data write operation.

18. (Original) The fabric of claim 17, wherein said control module provides commands to copy data and places said barrier entry for said data being copied.

19. (Previously Presented)   A network comprising:

at least one host adapted to be connected to a switched fabric;

at least two storage units, each adapted to be connected to a switched fabric; and

a switched fabric connected to and coupling the at least one host and the at least two storage units, the switched fabric comprising:

at least one switch for coupling to the at least one host and the at least two storage units; and

a storage processing device coupled to the at least one switch and for coupling to the at least one host and first and second storage units of the at least two storage units, where the first and second storage units may be directly connected to the storage processing device or may be coupled through the at least one switch, the storage processing device to migrate data between the first and second storage units whether the first and second storage units are directly connected to the storage processing device or are coupled through the at least one switch, the storage processing device including:

an input/output module including processors to receive, operate on and transmit network traffic; and

a control module coupled to said input/output module, said input/output module and said control module being configured to interactively perform data migration between the first and second storage units.

20. (Previously Presented)   The network of claim 19, wherein said processors include table information related to data migration and wherein said control module is coupled to said table information to maintain said table information for data migration.

21. (Previously Presented)   The network of claim 20, wherein said table information includes a barrier entry and said processors delay data write operations if said barrier entry relates to said data write operation.

22. (Previously Presented)   The network of claim 20, wherein said table information includes an entry related to the extents in the data migration, said entry defining an extent operation type.

23. (Previously Presented)   The network of claim 22, wherein said table information further includes a legend entry for each extent operation type defining migration operations for the extent.

24. (Original) The network of claim 23, wherein said table information further includes entries referenced by said legend entry defining physical extent location.

25. (Original) The network of claim 24, wherein legend entries include entries indicating data not migrated, data migrated and a barrier entry for data being migrated.

26. (Previously Presented)   The network of claim 25, wherein said processors delay data write operations if said barrier entry relates to said data write operation.

27. (Original) The network of claim 26, wherein said control module provides commands to copy data and places said barrier entry for said data being copied.

28. (Previously Presented)   A method for supporting data migration between first and second storage units connected to and coupled through a switched fabric, the switched fabric including at least one switch and a storage processing device, the storage processing device coupled to the at least one switch, where the first and second storage units may be directly connected to the storage processing device or may be coupled through the at least one switch, the method comprising in the storage processing device:

providing an input/output module including processors receiving, operating on and transmitting network traffic; and

providing a control module coupled to said input/output module, said input/output module and said control module being configured to interactively perform data migration between the first and second storage units whether the first and second storage units are directly connected to the storage processing device or are coupled through the at least one switch.

29. (Previously Presented)   The method of claim 28, wherein said processors include table information related to data migration and wherein said control module is coupled to said table information to maintain said table information for data migration.

30. (Previously Presented)   The method of claim 29, wherein said table information includes a barrier entry and said processors delay data write operations if said barrier entry relates to said data write operation.

31. (Previously Presented)   The method of claim 29, wherein said table information includes an entry related to the extents in the data migration, said entry defining an extent operation type.

32. (Previously Presented)   The method of claim 31, wherein said table information further includes a legend entry for each extent operation type defining migration operations for the extent.

33. (Original) The method of claim 32, wherein said table information further includes entries referenced by said legend entry defining physical extent location.

34. (Original) The method of claim 33, wherein legend entries include entries indicating data not migrated, data migrated and a barrier entry for data being migrated.

35. (Previously Presented)   The method of claim 34, wherein said processors delay data write operations if said barrier entry relates to said data write operation.

36. (Original) The method of claim 35, wherein said control module provides commands to copy data and places said barrier entry for said data being copied.

IX.   EVIDENCE APPENDIX

None.

X. RELATED PROCEEDINGS APPENDIX

None.